

## OpenGIS SYSTEM TO MONITOR THE IMPACT OF SPATIAL PLANNING POLICIES

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**ABSTRACT** - Based on the studies of European experience in spatial planning (policies, strategies, indicators), the project aims to create two databases for Romania, one at region level and one at the level of the administrative-territorial unit, in OpenGIS system using adequate indicators allowing for the identification and measurement of socio-economic development trends in a spatial context. To achieve this, competent studies will look at the differences between the European territorial indicators (EUROSTAT, ESPON) and the national ones, level NUTS II, or NUTS V. Following the identification of the two sets of territorial indicators, the structure of alphanumeric databases will be conceived in GIS. Concomitantly with the NUTS V digital map of Romania, alphanumeric databases will be fed with statistical data according to proposed territorial indicators schemes. Proposed model will be tested on territorial analyses by groups of indicators. The novelty consists in the spatial planning approach based on the conjunction between GIS and mathematical methods of evaluation and prognosis, the transposition of the mathematical method in a TurboC++ program, and the integration in the proposed system. Based on the results, NUTS II and NUTS V territorial indicators will be classified in groups, in charts and maps underlining socio-economic development disparities at national level. The GISTEREG project is conceived to be integrated into the OpenGIS database proposed by ESPON, aiming at a fast quantification of European regional policies. This is why the structure of the database will be conceived in accordance with EUROSTAT, level NUTS V, and ESPON and the Regional Operational Program – Priority Axis VI, level NUTS II. The proposed GISTEREG model, due to the mathematical component integrated into the system will be able to diagnose the main existing challenges and forecast the development of regions and zones within Romania. Databases obtained and presented in OpenGIS and mathematical instruments will provide a scientific method that could help identifying the underdeveloped areas requiring priority interventions based on European funds. Also, based on the experience of the purposed Consortium, punctual solutions will be recommended for a balanced development of the national territory.

**Keywords:** spatial planning, instruments and techniques, spatial scenarios, territorial impact of policies and strategies, creation of geo-referenced data and metadata bases and mathematical models, spatial scenarios

### 1. Background

Romania faces the most important development opportunity after joining the European Union on 1 January 2007 and it is increasingly integrating into a global economy. An essential role in the fast development of Romania is played by the implementation of new technologies and integration of research institutions into the afferent European networks. In this context, the proposed project aims at an impulsion of spatial planning research through a partnership between public and private research institutions. Moreover, its specific objective represents sustainable spatial planning research implying diminishing regional disparities. The project aims to create a model with a component on spatial planning and a mathematical one. European experience has demonstrated that the evaluation of regional development policies cannot be carried on by a single complex monitoring organism, namely EUROSTAT. The dynamics of implementing projects using European funds has led to flexible monitoring systems, such as ESPON. Romania's joining the European Union involves, besides a

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complex process of sustaining projects with European Union funds, advanced flexible systems for spatial planning at national, urban and rural levels, aiming to strengthen the administrative capacity of accessing structural and cohesion funds. In this regard, the project, carried out by INCD Urbanproiect, IGAR, Electrovâlcea, and CDCAS, proposes:

- an ESPON-compatible system based on relevant spatial indicators;
- application of modern management methods via IT – new spatial planning instruments and techniques – to evaluate projects implemented with European funds, according to the Regional Operational Program – Priority Axis VI (Technical Assistance).

The project is also relevant for regional development policy in Romania through foreseen results such as:

- implementation of modern spatial planning technologies;
- performing system useful for spatial planning analyses and international INTERREG projects on interregional cooperation;
- elaboration and publication of the methodology used to produce the system;
- central implementation of results (Ministry of Development, Public Works and Dwellings), and also at regional and county level (Regional Development Agencies, County Councils);
- strengthen administrative capacity of accessing European funds for the socio-economic development of Romania.

Due to the political changes within the latest 17 years and emergence of new member states of the European Union, new targets have been established in order to achieve socio-economic cohesion at the European level. Therefore, the **Lisbon Strategy** of the European Council (revised in February 2005) has established the goals of the European Union until 2015, in order to have the most competitive and dynamic knowledge-based economy, with as many and better workplaces and a strong social cohesion. Moreover, the **Goteborg Strategy** has set environmental objectives. The access to European Funds instituted for the achievement of all these objectives is based on projects. Their implementation leads to increased welfare in the European Union. Results are monitored based on a complex set of territorial indicators.

Currently, there is a strong system of evaluation and monitoring of regional European policies – the main engine of European economic development. **EUROSTAT** indicators have been completed by other indicators, at a different level, within the **ESPON** program.

INTERREG programs included the project **ESTIA**, aiming to establish a Planning Observatory in South-eastern Europe based on an integrated system of ESPON and ESDP-compatible territorial indicators.

A national study carried out by the National Statistics Institute and the World Bank aiming to adopt a minimum set of quantifiable indicators (82) at the level of administrative-territorial units has just been completed. Urbanproiect Institute has completed a series of projects within the AMTRANS competition aiming to produce regional strategies based on spatial GIS databases or developing a balanced and polycentric urban system and promote a new type of urban/rural partnership. Numerous national and international projects have been carried out by the Academy of Economic Studies on economic development models statistics and long and average term forecasts, resulting into governmental development programs.

The elaboration of the National Development Plan of Romania for 2007-2013 implies precise evaluation and monitoring of the national level of development. A very important component of this process is the spatial one that is accounting in the elaboration of projects for the spatial planning principles and the level of classifying the administrative-territorial units (NUTS II – development regions and NUTS V – administrative-territorial units).

Research/development institutes involved in the proposed topic are the national ones specialized in territorial development, the Ion Mincu University of Architecture and Urbanism from Bucharest, the National Economy Institute at the Romanian Academy, the Geography Institute at the Romanian Academy, the Economic Prognosis Institute, and socio-economic institutes.

## 2. Contribution of the project to research

The fast evaluation of the regional policies of the European Union and identification of intervention priorities have required, beside EUROSTAT, new approaches to monitoring the level of regional development by setting up a European network of Regional Observatories. Starting with the need of implementing them in Romania, the project proposes a computational-mathematical model for collecting statistical data enabling spatial analyses and the evaluation of development trends for the regions of Romania. An important role will be played by the experience of Urbanproiect – participant in numerous Intererreg projects and studies on setting up national and international spatial databases. Another important role will be played by the Geography Institute at the Romanian Academy in identifying relevant indicators for evaluating regional policies.

Based on the experience of the two aforementioned institutions and of ESPON, two systems of spatial indicators will be used: some used at the level of administrative-territorial units and some used for development regions. Based on proposed indicators and in accordance with ESPON, two OpenGIS spatial databases will be developed. Access will be granted using three levels (administrator, user, and guest). An important role in creating the databases will be played by Urbanproiect and S.C. Electrovâlcea Râmnicu Vâlcea. In order to assess the territorial impact of sector and structural policies, spatial databases and the C++ mathematical model will form the computational-mathematic model GISTEREG. S.C. Electrovâlcea Râmnicu Vâlcea will conceive the mathematical model, while the spatial analyses and development trends resulting from its application fall into the responsibility of Urbanproiect and CDCAS. Finally, the project proposes to create a map reflecting current development of regions and intervention priorities by proposing projects in order to access European funds. The project will have a WEB page dedicated to the presentation of results. The creation of the computational model and the results of applying the GISTEREG model will be published in 100 copies.

*The novelty* of the project consists in the proposed scheme of indicators, based not only on quantitative, but also on qualitative indicators expressing development trends, not only the existing situation at a given time. Another novelty element is the integration of a TurboC++ mathematical model in spatial OpenGIS databases, resulting into the GISTEREG computational-mathematic model.

The methodology and techniques are:

- Methodology of designing and creating databases by groups of spatial indicators;
- Integration of spatial databases in OpenGIS;
- Creation of a computational-mathematic model by integrating into the computational system a mathematical model of evaluating the territorial impact of spatial planning policies and strategies.

An important role in implementing the GISTEREG project will be played by Regional Development Agencies and Regional Development Councils, that are to collaborate with Urbanproiect for the project.

The general objective of the project is to provide information, analyses, and scenarios on territorial dynamics in Romania based on implementing modern IT technologies and mathematical evaluation and prognosis methods. The objective will be achieved by monitoring indicators of evaluating the objectives of the Regional Operational Plan in order to reduce disparities between development regions and identify intervention priorities in order to reduce disparities between regions and zones within regions.

The problems pertaining to current situation of national spatial planning policies, proposed to resolution, are:

- Develop advanced techniques and instruments for the spatial planning of the national, urban and rural territory in order to strengthen the administrative capacity of accessing structural and cohesion funds;
- Set an informational system for monitoring the level of development of spatial planning in Romania, according to the new directions of the European Union established through Lisbon and Göteborg Strategies;
- Increase administrative capacity of accessing structural and cohesion funds (regional and local councils, ADRs);

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- Obtain European funds for the integration in ESPON;
- IT in urbanism and spatial planning, using modern European technologies.

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